

Title page

1. Title: THE POTENTIAL ROLE OF TAXES AND SUBSIDIES ON FOOD IN THE PREVENTION OF OBESITY IN EUROPE.

2. Corresponding author:

Carlos Alvarez-Dardet
University of Alicante
Community Nursing, Preventive Medicine & Public Health and History of Science
Department.
Ctra. de San Vicente del Raspeig s/n. 03690 Alicante
Apdo. Correos, 99. E-03080 Alicante (España)
Tfno: +34 965903919 Fax: +34 965903964
E-mail: Carlos.alvarez@ua.es

3. Authors

Laura Inés González-Zapata
Nutrition and Dietetics School, University of Antioquia, Medellín-Colombia
Community Nursing, Preventive Medicine & Public Health and History of Science
Department. University of Alicante, Spain.

Carlos Alvarez-Dardet
Community Nursing, Preventive Medicine & Public Health and History of Science
Department. University of Alicante, Spain.

Erik Millstone
SPRU - Science and Technology Policy Research
Freeman Centre, University of Sussex, Brighton - UK

Vicente Clemente-Gómez
Community Nursing, Preventive Medicine & Public Health and History of Science
Department. University of Alicante, Spain.
CIBER en Epidemiología y Salud Pública (CIBERESP). University of Alicante, Spain

Michelle Holdsworth
Institut de Recherche pour le Développement (IRD), Montpellier, France

Rocio Ortiz-Moncada
Community Nursing, Preventive Medicine & Public Health and History of Science
Department. University of Alicante, Spain.

Tim Lobstein
IASO – IOTF. London, UK.

Katerina Sarri
Preventive Medicine & Nutrition Clinic. University of Crete - School of Medicine, Greece

Bruna De Marchi
Institute of International Sociology. Gorizia-Italy

Katalin Z. Horvath
Semmelweis University, Faculty of Health Sciences,
Department of Dietetics and Nutrition Sciences
Budapest, Hungary

4. Keywords: nutrition policy, obesity, tax food, public health nutrition, pricing policy

5. Word count: 4349 words

Running title: Taxes and subsidies on food in Europe

Licence Statement:

The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence (or non exclusive for government employees) on a worldwide basis to the BMJ Publishing Group Ltd and its Licensees to permit this article (if accepted) to be published in JECH editions and any other BMJ PGL products to exploit all subsidiary rights, as set out in our licence (<http://jech.bmj.com/fora/licence.pdf>).

Figure Legends:

Figure 1. Ranking of average values of all options.

Figure 2. Ranking of average values for taxes and subsidies.

Figure 3. Options with best values for taxes and subsidies.

Figure 4. Ranking of average values by country under social and economic criteria for taxes and subsidies as categories.

Abstract:

Background: Obesity implies costs not only for the individual but also for society . We explore the opinions of stakeholders on the potential of taxes or subsidies, as measures for tackling obesity in Europe.

Methods: Structured interviews using Multicriteria Mapping, a computer based, decision support tool. With 189 interviewees drawn from 21 different stakeholder categories across nine members of the EU interviews, to appraise 20 pre-defined policy options aimed at reducing obesity, including 'taxing obesity-promoting foods' and 'subsidising healthy foods'. A four step approach involved selecting options, defining criteria, scoring options quantitatively and weighting criteria to provide overall rankings of options. Interviews were recorded and transcribed to yield qualitative data.

Results: Compared with other policy options appraised, taxation and subsidies were not favourably received, mainly because they were considered difficult to implement. Overall, trade unions rated both options more favourably than all other stakeholder groups. As anticipated, both options received their lowest scores from representatives of the farming, food processing and advertising industries. Nutritional/obesity advisory experts and public sector caterers gave the most positive ratings to subsidies overall. Along with public health professionals large commercial retailers were most in favour of taxation.

Conclusions: Taxation and subsidies were poorly appraised compared with other policy measures, with stakeholders expressing reservations mainly focussed on the practicalities and cost of introducing such measures. Although that applying taxes/subsidies could be useful to combat obesity, our study suggests that most stakeholders still need to be convinced of their viability and acceptability when compared with other measures.

Introduction

It is now apparent that the public health problem of escalating obesity has been brought about by the convergence of economic, environmental and cultural forces. [1-3] that are capable of destabilising the natural physiological regulation of energy balance. Given its complex aetiology, it is unlikely that the pandemic of obesity can be reversed by strategies based exclusively on educational campaigns aimed at changing individual behaviour, without also creating a supportive environment.

At present the European Union's (EU) Common Agricultural Policy tends to subsidise surpluses of foods high in calories but low in vitamins, minerals and fibre, rather than foods that could help protect against obesity. Current approaches focus on subsidising production of certain crops in order to stabilise prices, supporting agricultural production and guaranteeing food supply.[4] Objections have, however, been raised in terms of the unintentional secondary effects such policies might produce.[2,5]

Imposing taxes on food could serve several purposes e.g. by raising general revenue in the EU to fund other interventions to promote healthier eating, and by influencing purchasing patterns. The price of foods is a major influence on purchasing, consequently, it might be reasonable to expect that a population's dietary habits could be changed through the application of economic measures.[6] For example one study conducted by the UK's Food Standards Agency revealed that of all factors influencing food choice, the most decisive was price.[7]

Technological developments over recent decades have generally lowered the price of acquiring calories (as food has become cheaper relative to incomes and to non-agricultural commodities) and reduced the likelihood of expending them. Hence, reducing economic incentives for maintaining a healthy balance between food intake and physical activity.[8] Economic factors, including more sedentary jobs and cheaper cars, have also helped to create an obesogenic environment.[9,10] Together, these elements form the base from which it is possible to obtain larger portions of food for a given amount of money, and where sitting in front of a computer at work is associated with maximum productivity. Consequently, there is a growing interest in developing the best strategies possible for achieving healthy dietary habits.[11]

As a response to this concern, various proposals have been put forward besides food taxation and subsidies, for example, public education campaigns, controls on advertising, promotion of healthy eating in schools, and changing the built environment. The World Health Organisation maintains that controlling the price of healthy foodstuffs is a key factor in improving diet and preventing disease.[12] The European Health Network has called for a broad-based and integrated food policy, which would include policies for price control.[13] In addition, in the November 2006 European ministers signed a Charter committing them to creating a balance between individual and social responsibility.[14]

The practice of taxing products as a health policy has a long tradition in public health, and has proved to be effective in controlling consumption and consequently improving health, as can be seen in the cases, for example, of alcohol [15] and tobacco.[16] The theoretical foundation for using economic incentives to regulate dietary habits is the assumption that demand/price curves are downward sloping. However, the use of differentiated food taxes or subsidies to achieve nutritional objectives has not been widely employed in EU public policies, and thus empirical evidence on the effects is scarce, diverse and inconclusive.

The dual aim of this paper, therefore, is firstly to appraise how taxing obesity-promoting-food and subsidising healthy foods perform compared with other policy options aimed at preventing obesity in the EU; and secondly to analyse the viewpoints of a wide range of stakeholders on the implementation of subsidies and taxation, to assess whether the debate is as polarised as the literature and traditional stakeholder positions suggest. Evidence for

these expected different points of view comes from on-going debates [17], where public health nutritionists see modifying the obesogenic environment as a priority for obesity prevention [18,19], whilst those within large food industry place more importance on the individual's responsibility to effect self-control [20]. Industry also places more emphasis on inadequate physical activity as the main contributor to obesity, rather than consumption of energy dense foods. [21,22] This led us to the apriori hypothesis that fiscal interventions are therefore less likely to be favoured by industry because they do not rely on individual self-control nor on physical activity. However, there is a lack of published empirical data on these different stakeholder positions.

Methods

Mapping tool

Multi-criteria mapping (MCM)[23,24] is a novel decision-analysis technique used to provide an integrated, comparative analysis of the different viewpoints of key stakeholders. In this study it was used to appraise 20 pre-defined policy options, including one on 'taxes on obesity-promoting foods' and a second on 'subsidies on healthy foods'.

MCM provides information not only on how different options are expected to perform, but also on the reasons for those appraisals, and is described in detail elsewhere.[24,25] Quantitative and qualitative data were gathered from a large number of stakeholders to ensure that a comprehensive range of views was mapped. The nine national teams contributing to the Policy Options for Responding to the Growing Challenge of Obesity Research (PorGrow) [26] project selected 21 stakeholder categories to be interviewed in each of the countries (Cyprus, Finland, France, Greece, Hungary, Italy, Poland, Spain and the United Kingdom), representing actors and institutions which may play an important role in policymaking, either directly or through networks of influence. It is possible to combine these categories into stakeholder affinity groups sharing common commercial, corporate or professional interests. These groups were called "Perspectives". In order to provide consistency across national contexts, it was agreed at a project meeting held in September 2005 that all national teams would undertake the initial analysis of the interviewees using an agreed list of perspectives. The shared set of perspectives is shown in Table 1.

The countries were chosen to encompass Europe's contrasting economies, gastronomies, geographies and cultures. The stakeholders were chosen to encompass those groups likely to be essential in, or important to, an effective policy network.

Table 1. Interviewees grouped into perspectives for analytical purposes

| Perspectives | Category |
|---|---|
| A. Public interest non-governmental organisations | 7 Representatives of consumer groups 19 Public health non-governmental representatives 20 Public interest sport and fitness NGOs 21 Representatives of trades unions |
| B. Large industrial and commercial food chain organisations | 1 Farming industry representatives 2 Food processing company representatives 3 Representatives of large commercial catering chains 4 Representatives of large food retailers |
| C. Small food and fitness commercial organisations | 5 Representatives of small 'health' food retailers 13 Representatives of commercial sport or fitness providers |
| D. Large industrial and commercial non-food organisations | 12 Representatives of the life insurance industry 17 Representatives of the advertising industry 18 Representatives of the pharmaceutical industry |
| E. Policy-makers | 8 Senior official government policy makers in the health ministry 9 Senior official government policy makers in the finance ministry |
| F. Public providers | 6 Representatives of public sector caterers 11 Town and transport planners 14 Representatives of school teachers |
| G. Public health specialists | 10 Public health professionals 15 Members of nutrition/obesity advisory committees 16 Health journalists |

Selecting stakeholders

To select the individual interviewees, national teams used both an exhaustive web search (using as key words the translation into local languages of the stakeholder categories previously agreed) and a snowball approach using information gathered from key informants and identified stakeholders. The aim was to select stakeholders at the highest national level, who were involved in corporate or public policy-making and could act as spokesperson for their stakeholder category. The project coordinator (EM) ensured that there was sufficient comparability of stakeholder roles between countries by discussing issues surrounding cross country comparisons of the identified stakeholders' national roles with the participating teams.

Once the candidates for interview had been identified, they were contacted by telephone and sent an invitation letter, along with a leaflet in the local language containing information on the project. When the selected stakeholders agreed to participate, a second package with information on MCM methodology and an example of a previous mapping exercise on energy options was sent by post. They were contacted again by telephone to address any remaining questions, giving further information where necessary, and to arrange a time and place to conduct the 2-3 hour interview appropriately, that is, without interruption. This process is known as 'scoping' in the MCM procedure.[24] The interviews were conducted following a common procedure which included tape-recording, the use of special software developed specifically for the project, and adhering strictly to the procedures described in the interview manual (http://www.sussex.ac.uk/spru/documents/02_mcm_interview_manual.pdf). Almost all invited participants agreed to be interviewed (Greece omitted category 6, public sector catering, since catering in all Greek public sector institutions is provided by private contractors), and in a few cases they asked to bring colleagues to join in the procedure. All participants accepted the procedures and all participants successfully completed the interview, although the time taken for participants to undertake the interview process varied.

Conducting interviews

The MCM interview consists of four steps. Firstly, participants selected and defined a set of policy options that they would evaluate. Prior to the formal start of the project, an attempt was made to identify as wide a range as possible of the policy options under consideration by public policymakers and public health policy analysts for addressing the increasing prevalence of obesity. The scope of this investigation ranged from international organisations such as the World Health Organization and the European Commission, and the governments of European Union (EU) Member States, to national and EU NGOs representing industrial, commercial, consumer and public health organizations.

Selecting policy options

Thus, before the project's initial launch meeting in September 2004, inter-partner exchanges had produced a set of some 28 policy options from which core and discretionary options could be chosen. All partners from the nine participating countries were asked to indicate which of those options could sensibly be considered as relevant to their national contexts. The resulting set of options was then divided into two subsets: namely those that were candidates for the role of "core options" and those that were candidates for the role of "discretionary options", and these were tabled by the principal investigator (EM) at the first project meeting. Core options were one that all interviewees would be asked to appraise, while discretionary options were suggestions not requirements. All interviewees were also invited to introduce any further additional options they deemed worth consideration and appraisal.

Debate produced a consensus list of seven core options and 13 discretionary options. For each policy option, three levels of description were developed: a summary phrase, a longer phrase and a full description so that interviewees would have a clear understanding of the

options that they were being required and/or invited to appraise. The resulting list is shown in Table 2.

Table 2. The 20 predefined (Core and Discretionary) options

| Core options | Discretionary options |
|--|--|
| 1. Change planning and transport policies 2. Improve communal sports facilities 3. Controls on food and drink advertising 4. Control sales of foods in public institutions 5. Require mandatory nutrition labelling 6. Provide subsidies on healthy foods 7. Impose taxes on obesity-promoting foods | 8. Improve training for health professionals 9. Common Agricultural Policy reform 10. Improve health education for the general public 11. Control the composition of processed food products 12. Provide incentives to improve food composition 13. More obesity research 14. Provide incentives to caterers to provide healthier menus 15. Include food and health in the school curriculum 16. Medication for weight control 17. Substitutes for fat and sugar 18. New government body 19. Control the use of marketing terms 20. Increase the use of physical activity monitoring device. |

For the purpose of this article, we have specifically focused on the valuation of all those interviewed on the choice of two public policies, options 6 and 7 in Table 2, defined as:

1. **Taxes on obesity-promoting foods:** Change food prices to influence people's dietary choices by increasing the price of obesity-promoting foods, including those high in fat and sugar, as a disincentive for consumers to purchase them. Methods for increasing the price of obesity-promoting foods could include a "fat tax", or extending Value Added Tax to cover some dairy foods, fast food and sweet food, and
2. **Subsidies on healthy foods.** Public subsidies on healthy foods to improve patterns of food consumption: Change food prices to influence people's decision making in favour of healthier foods by introducing subsidies to lower the prices of healthy foods, making them more affordable.

Appraising the performance of policy options

Secondly, each interviewee provided a set of evaluative criteria to represent their particular viewpoints. The 'criteria' are the different factors that the interviewee has in mind when they choose between, or compare, the pros and cons of different options. These may address any issue that has relevance to their assessment of the performance of any of the options, but the criteria must be applicable to assessment of all the options.

Thirdly, options were evaluated according to each criterion and scores on an ordinal numerical scale were given by the interviewees: the higher the score, the more optimistically the interviewee appraised the performance of the option. Here, interviewees were asked to assign numerical scores to characterize their own view of option performance. Usually, interviewees chose to use a 10-point or 100 point range to define these interval scales. Interviewees expressed their judgements of uncertainty as regards the performance of the options by awarding both an optimistic and pessimistic scores to each option.

For purposes of analysis and comparability in this section, we have focussed on the criteria from which taxes on obesity-promoting foods and subsidies on healthy foods were highlighted when compared with the other options.

Fourthly, a quantitative weighting was assigned by interviewees to each criterion, in order to reflect its relative importance according to their viewpoint. Using a simple formula, the scores under each criterion were multiplied by the criteria weightings to produce an overall pessimistic and optimistic relative ranking for each option.

Data analysis and interpretation

Interviews were audio recorded and transcribed, as the reasons provided by interviewees for their judgements were as important as their quantitative judgements. Once the interviews were completed, several techniques were used to keep in touch with the stakeholders and obtain feedback for incorporation in the results.

In order to facilitate data analysis, a separate specialist software package called MCM Analyst was developed at the University of Sussex, as part of the PorGrow project. This includes a relational database containing both quantitative and qualitative data relating to all participants, interlinked with textual reports for representing relevant sections of the qualitative data in graphics and narrative forms.

Each stage in this analysis was performed primarily by the national teams, although key interpretations were finalized through iterative consultation between national teams and under central coordination to ensure comparability across national analysis.

The findings at each stage were documented separately in the national and international reports (see <http://www.sussex.ac.uk/spru/porgrow>). Further details of the methodology can be found in the Interview Manual and in the Analysis Manual (see <http://www.sussex.ac.uk/spru/1-4-7-1-8-2-1.html>).

Finally and for analytical purposes, in order to facilitate comparisons between the appraisals made by different stakeholders, and for the purposes of this article, the appraisal options tax/subsidies were compared according to stakeholders, the country of origin, and the selection criteria considered by those interviewed in their assessment.

Results

Interviews were conducted between November 2004 May 2005. Twenty one stakeholder categories were interviewed in each country. The overall aggregated options ranking across all interviewees in all nine participating countries are given in Figure 1. The results showed that of the Core options, policies to improve the availability of, and access to, sports facilities, to improve nutritional labeling, and to improve food sales in public institutions scored highly overall and in virtually all countries. Of the discretionary options, educational options focusing both on school children and the general adult population were the most popular.

On average, the 189 European stakeholders consulted in the 9 participating countries gave low scores and ranks to economic measures involving taxing obesity-promoting food. Subsidising healthy foods received a slightly higher rating than taxes, but implementation of either option was perceived to be limited by unfavourable implications.

Nevertheless, when results for taxes were analysed further by reference to stakeholder profiles, it was seen that three categories of interviewees had given scores slightly over 50, on a normalised 0-100 scale. Those categories were: representatives of large commercial retail chains, public health professionals and trade unions (see Figure 2). Although they did not provide many supporting arguments, they based their assessment on the importance of price in determining shopping habits.

As for subsidies, representatives from public sector catering, expert nutrition/obesity advisory committees and trade unions gave that option the highest scores. The reasons given for their optimistic evaluations were that it was technically easy to put in place once the political will was there, that it would benefit some food manufacturers, and that subsidies would be widely accepted by citizens as they would lead to cheaper prices and enable better access to 'healthier' subsidised foods for lower socio-economic groups. Some arguments are showed in table 3 (comment 1, 2).

On the other hand, the lowest scores for both taxes and subsidies were given by representatives of the farming industry, town and transport planning, the food processing industry and the advertising industry. Among the reasons they gave for their assessments were the importance of the free market and freedom of choice for the consumer. Table 3 (comment 3, 4, 5).

In addition, some interviewees felt that this classification would imply dividing food into two categories; good and bad, and that it is the overall diet, rather than specific products, which cause obesity. In this case, the principal difficulty would be in identifying which foodstuffs should be taxed or subsidised. Table 3 (comment 6, 7).

Furthermore, the interviewees indicated the implications of taxing obesity-promoting food, pointing out the possible negative impact of this tax on low-income individuals and families, for whom food constitutes their principal outgoings. Table 3 (comment 8).

Moreover some of those interviewed (usually those who gave this option lower scores) considered these measures to be a target for manipulation by industry, with potential for corrupt practice. Table 3 (comment 9, 10).

Differences between interviewees by country

As can be seen in Figure 3, when the quantitative results were analysed by country, differences became apparent. Some representatives of specific areas in each country were in favour of the taxation option as a public policy, with scores close to or over 80 on a scale of 0 to 100. In Finland, 5 of the 21 interviewees gave high scores to the taxation option. In the remainder of the countries, 2 interviewees per country gave high scores, except in Poland, where no high scores were given for this option.

As regards the possibility of subsidising healthy food, 6 interviewees from Finland gave high scores, followed by Poland and France with 3 interviewees per country. The stakeholder category which produced high scores with most frequency (3/9 countries) was that of public health professionals, both for taxes (Italy, France and Spain) and subsidies (Spain, France and Poland).

Appraisal of options according to different criteria

The approach of manipulating food supply through fiscal measures gave a mixed pattern: taxes on obesogenic foods generally scored poorly, especially in terms of cost to individuals especially in poorer communities, but were seen as being favourable to public sector finances, particularly in Greece. Furthermore those stakeholders who were critical of the measure at the same time accept that there are some positive aspects to the tax option: there were possible gains to be made in terms of social benefits (e.g. reduced inequalities, depending on how the measures were applied) and extra health benefits. On these criteria, Finland was the country that gave highest scores to the tax option. Conversely, subsidies on healthy foods were recognised as being costly to the public sector but not to individuals or for the commercial sector.

Furthermore, as can be seen in Figure 4 all bars cramped over to the left by the contribution of the selected criteria to the overall appraisal. As regards the cost to individuals, Finland, Greece and Poland were the countries which gave more positive scores to the subsidy option, while Cyprus, followed much further down the list by Greece and Hungary, gave more favourable scores to costs for the commercial sector. Table 3 (comment 11).

Finally, the participants expressed that, as with many other options, a successful strategy requires consumer education and health promotion for maximum benefit:

“This strategy could be combined with nutritional labelling or the use of the traffic light system so that those products which are unhealthy could be labelled with a red “unhealthy” sign. Thus, it will be up to the consumers to buy them or not.” (Greece, sports providers)

“It is preferable to educate the population about the fact that there are some foods that can be consumed generously but others only in moderation, rather than penalizing through taxes according to this classification”. (Spain, health ministry representative)

Table 3. Interviewees comments

| # | Quote(s) | Country |
|---|--|---------|
| 1 | “Today people have such economic problems that knowing that a food costs more not because of its quality but because it is unhealthy would be a strong disincentive”. | Italy |
| 2 | “100% support! It is costly, but money is in another pool” . | Poland |
| 3 | “... I don't really like either subsidies or extra taxes: these interventions distort market conditions, and won't work. Policies like that have just never worked out. Market mechanisms should be left undisturbed; the demand for healthy products should be raised by telling people about the dangers of obesity and the benefits of healthy products, but in the end, the actual decision (what to buy) should be left to them”. | Hungary |
| 4 | “It is not considered that a specific economic policy would have any influence on trends in what people eat”. | Spain |
| 5 | “... I feel that it would be difficult to create a scheme of potential subsidies based on what is healthy or not. The criteria need to be a lot more specific; otherwise there will be confusion in the market. The competition committee will react strongly against it, because by subsidising some products on the basis that they are healthy they automatically consider all the rest as unhealthy.” | Greece |

| | | |
|----|---|---------|
| 6 | "Penalizing fat with taxes is a difficult question. We have to eat between 15-20% fat, so what are they going to penalize? Normal food? It all depends on the quantity you eat..." | Spain |
| 7 | "Taxing high fat foods: I am from the Périgord [region]: my duck fat, my foie gras; listen, you make me want to cry! It's a tax on fat that is absolutely good for you...but it is just a question of quantity." | France |
| 8 | "I think it's a very regressive tax because it's taxing people with less money, because people with less money are more likely to buy high fat, high sugar foods. And also, I think the [effect of] price (on) demand for fat is probably pretty low, I think it's a pretty elastic demand for fat, so I don't think it'll make much difference." | UK |
| 9 | "...This would not change eating habits, and producers and vendors will always find the loopholes to circumvent regulation." | Hungary |
| 10 | "Lovely idea, but the subsidy system would cause more damage – temporary effect but creating opportunities for many abuses" | Poland |
| 11 | "Pricing policy is a powerful tool for changing behaviour." | Finland |

Discussion

The main aim of this analysis is to assess views regarding introducing taxation on obesity-promoting food and subsidies on healthy food compared with other policies aimed at preventing obesity in the EU. Compared with the 18 other core and discretionary options appraised, taxation and subsidies were not favourably received, mainly because they were considered difficult to implement. Imposing food taxes has traditionally been unpopular among the general population, and there was unease from many that taxation, in particular, would be unacceptable. Concerns expressed by some stakeholders in this study that taxation would fall disproportionately on low-income consumers seems to be unfounded [2,8] particularly if taxation is not limited to a single nutrient or food, and is balanced by reduced taxes, or subsidies on other foods. The implementation of taxation on a certain category of food, group of foods, or method of preparation as a public policy mechanism for controlling calorie consumption is not generally viewed as either a priority or as acceptable and effective for dealing with the obesity epidemic.

Nevertheless, there are significant differences as regards potential implementation by country, Finland being notably more in favour than other countries. Finland, Norway and Sweden constitute the three Scandinavian countries with a tradition of adopting centralised political measures with regard to nutrition and food. Norway enacted its first nutrition plan of action in 1976, and Finland in 1989, where fiscal measures were adopted as a strategy for achieving the nutritional objectives outlined by the plans, using a combination of food subsidies, price manipulation, retail regulations, clear nutritional labelling and public education focused on individuals.[27,28]

As suggested by the arguments put forward by international organisations (the WHO and IOTF), econometric studies in several countries indicate that prices do have an impact on patterns of food consumption.[8,29] Nevertheless, although it is possible to find a wide range of examples of taxes on food products, these have usually been implemented with a view to raising national revenue rather than with the aim of influencing dietary habits and improving health.[19,30] Available evidence relating to the use and impact of food taxation on dietary habits is inconclusive, and is limited to retrospective descriptions, or to short periods of time, due to lobbying from the agri-food industry.[19] The effects of subsidies differ according to whether they are applied to supply[5] or demand.[31] Some studies demonstrate the advantages of applying subsidies to demand for specific food products in local action programmes.[32] The effect on health, as a public policy measure, has been studied to a lesser degree.[31,33]

Cost may be considered the main argument in favour of public intervention from a strictly economic perspective, implying that price influences demand in food consumption. Some authors suggest that rather than applying fiscal measures such as food taxes and subsidies in order to combat obesity, subsidies for the production of basic foodstuffs should be withdrawn, as these distort the EU's common agricultural policy (CAP). That is to say, that those foodstuffs whose production is currently subsidised are precisely those for which food taxation is being proposed. A step in that direction was the 2003 CAP reform, the main aim of which was to bring supply in line with demand.[34] Ironically the potential cost of introducing subsidies and taxation on the commercial sector and individuals were major concerns to the stakeholders interviewed.

The second purpose of this study was to analyse the different viewpoints of a wide range of stakeholders on the implementation of subsidies and taxation, to assess whether the debate is as polarised as the literature and traditional stakeholder positions suggest. Not all stakeholders were opposed to the implementation of taxes/subsidies. Historically the debate has been polarised between two positions; those who support the argument based on individual behaviour,[21] and those who see the solution in more structural terms.[18] The

latter (structuralists) are more likely to support food taxes, whereas those who see the individual as primarily responsible are more likely to reject taxes.[19] This polarisation is reflected in some of the results of this study, where positive scores were recorded by representatives of public health professionals, trade unions, health NGOs, public sector caterers and expert nutrition/obesity advisory committees (for subsidies). Also as expected, negative scores were recorded by representatives of the farming, food processing and advertising industries. However, views from different stakeholder groups did not always follow what one might expect. Large commercial caterers, for example, supported taxation more than other stakeholders, which is surprising given that they could incur increased food costs as a result. Since however it might affect all equally, it need not change their relative competitiveness. Also unpredictable was the support of large food retailers for taxation-although they remained unfavourable towards subsidies, again one could imagine that taxation would increase prices of some products and therefore be a disadvantage their business, relative to other sectors. On the other hand, we had expected consumer organisations and town and transport policies to be favourable to fiscal intervention, given their role in working for the public; but taxation and subsidies were evaluated poorly by them. However their reservations were different to stakeholders in the food processing, advertising and farming industries- consumer groups were concerned about putting controls on consumer freedom to choose, about disproportionate effects of taxation on lower income groups, and concerns about feasibility were strong from town planners.

Finally, and taking into account the methodology used in this study, caution should be exercised when interpreting the results; the final map of options corresponds to averages between the ranges of all participants, with variations in scoring under different criteria for each participant and between participants when the categories are combined. A loss of accuracy in the information is therefore unavoidable when aggregating and averaging. Additionally the position of different stakeholders could have been influenced by their commercial interests and/or their professional expertise. However, a quantitative check indicated that omitting potentially self-serving judgements changed the overall outcomes by no more than +/- 1%.[35]

In conclusion, although stakeholders in the political network influencing obesity are not, when viewed collectively, in favour of the application of economic regulation at the present time, compared with other policy measures, neither was there a consensus against implementation of these measures. The standpoints of stakeholders were influenced to some extent by their interests and by their expectations of the costs of regulation, but Stakeholders' viewpoints did not always fit into what was expected from conventional positions. In addition, the political culture of each country would seem to have an important influence on the positions of the various stakeholders. Investigation into fiscal measures applied to food as a means of controlling obesity should not be abandoned, as there is some evidence that this can influence food consumption patterns. Our study shows that a decision to apply economic measures such as taxes/subsidies in the EU represents one possibly course of action, as part of an integrated and coherent public policy aimed at combating obesity, but only under certain conditions. However, stakeholders will need to be convinced of their viability and acceptability, when compared and integrated with other measures.

What is already known

The practice of taxing products as a health policy has a long tradition in public health, and has proved to be effective in controlling consumption and consequently improving health, as can be seen in the cases, for example, of alcohol [15] and tobacco.[16] The theoretical foundation for using economic incentives to regulate dietary habits is the assumption that demand/price curves are downward sloping. However, the use of differentiated food taxes or subsidies to achieve nutritional objectives has not been widely employed in EU public policies, and thus empirical evidence on the effects is scarce, diverse and inconclusive.

What this paper adds

The practice of taxing products as a health policy has a long tradition in public health, and has proved to be effective in controlling consumption and consequently improving health, as can be seen in the cases, for example, of alcohol and tobacco.

Price is an important factor for the consumer when choosing food. Consequently, it would be reasonable to assume that the population's dietary habits could be changed through the application of economic measures. The idea behind modified food taxes or subsidies is to provide consumers with economic incentives to change their habits in line with nutritional recommendations, thus reducing the probability of being exposed to obesity and other health risks.

To apply economic measures such as taxes/subsidies in the EU represents one possibly viable course of action, as part of an integrated and coherent public policy aimed at combating obesity, but under certain conditions and with improved stakeholder support.

Acknowledgements

Supported by New and Emerging Science and Technology (NEST) research programme, financed by the 6th Framework Programme for research and technological development of the European Commission (contract no.508913). The content of this publication is the sole responsibility of its authors and does not necessarily reflect the views or policies of the NEST research project or the European Commission.

The research team is greatly indebted to all European stakeholders who participated in the project and devoted their precious time to the project. The research team wish to express their sincere thanks to the national PORGROW teams for to share their cross-national PorGrow database, and our partners Patrik Borg from UKK Institute for health Promotion Research (Finland), Savvas C Savva from Research and Education Institute of Child Health (Cyprus), and Lucjan Szponar from National Food and Nutrition Institute (Poland).

This paper will be used as part of Laura I Gonzalez PhD training programme and dissertation at the University of Alicante- Spain

Competing Interest: None to declare.

References:

- 1 WHO Europe. The challenge of obesity in the WHO European region and the strategies for response (August 2006). Available from: URL: http://www.euro.who.int/Document/NUT/Instanbul_conf_edoc06.pdf (accessed 5 June 2007).
- 2 Kim D, Kawachi I. Food taxation and Pricing strategies to “Thin Out” The Obesity Epidemic. *Am J Prev Med*. 2006;**30**(5):430-7.
- 3 WPT James. The Epidemiology of the obesity: the size of the problem. *J Intern Med*. 2008;**263**(4):336-52.
- 4 Hawkes C. Promoting healthy diets and tackling obesity and diet-related chronic diseases: what are the agricultural policy levers?. *Food Nutr Bull*. 2007;**28**(2 Suppl):S312-22.
- 5 Fields S. The fat of the land: do agricultural subsidies foster poor health?. *Environ Health Perspect*. 2004;**112**(14):820-3.
- 6 Winson A. Bringing political economy into the debate on the obesity epidemic. *Agric Human Values*. 2004;**21**:299-312.
- 7 French, S. Public health strategies for dietary change: Schools and workplaces. *J Nutr*. 2005;**135**:910–12.
- 8 Jensen JD, Smed S. Cost-effective design of economic instruments in nutrition policy. *Int J Behav Nutr Phys Act*. 2007;**4**:10-22.
- 9 Hill JO, Sallis JF, Peters JC. Economic analysis of eating and physical activity: a next step for research and policy change. *Am J Prev Med*. 2004;**27**(3 Suppl):111-6.
- 10 Tillotson JE. America’s obesity: conflicting public policies, industrial economic development and unintended human consequences. *Annu Rev Nutr*. 2004;**24**:617-43.
- 11 WHO Europe. Proposed outline for the second action plan for food and nutrition policy 2007-2012. (27 September 2006). Available from: URL: http://www.euro.who.int/document/nut/Instanbul_conf_edoc09.pdf (accessed 14 November 2007).
- 12 World Health Organization- Food and Agricultural Organization. Diet, nutrition and the prevention of chronic diseases. Technical report series 916. Geneva: WHO,2003.
- 13 European Heart Network. Food, nutrition and cardiovascular disease prevention in the European region: challenges for the new millennium. Brussels:2002. Available from: URL: <http://www.ehnheart.org/files/millennium-143851A.pdf> (accessed 14 November 2007).
- 14 WHO Europe. European Charter on Counteracting Obesity. Istanbul, Turkey: WHO European Ministerial Conference on Counteracting Obesity (November 2006). Available from: URL: <http://www.euro.who.int/Document/E89567.pdf> (accessed 1 December 2007).
- 15 Institute of Alcohol Studies. Alcohol and Tax. St Ives: Institute of Alcohol Studies,2003.
- 16 Townsend J, Roderick P, Cooper J. Cigarette smoking by socio-economic group, sex, and age: effects of price income and publicity. *BMJ*.1994;**309**:923-7.
- 17 Cannon G. Why the Bush administration and the global sugar industry are determined to demolish the 2004 WHO global strategy. *Public Health Nutr*. 2004;**7**:369-380.
- 18 Lang T. The public health impact of globalisation of food trade. In: Shetty P, McPherson K, eds. *Diet, nutrition and chronic Disease: lessons from contrasting worlds*. London: J Wiley, 1997:173–86.
- 19 Caraher M, Cowburn G. Taxing foods: implications for public health nutrition. *Public Health Nutr*. 2005;**8**:1244-51.
- 20 Delpeuch F, Maire B, Monnier E, Holdsworth M. Globesity- a planet out of Control. Earthscan Books: London, 2009.
- 21 Ashton D. Food advertising and childhood obesity. *J R Soc Med*. 2004;**97**(2):51-2.
- 22 Jebb S, Prentice A. ‘Obesity in Britain: gluttony or sloth?’. *BMJ*. 1995;**311**:437-39.
- 23 Stirling A. Analysis, Participation and Power: justification and closure in participatory multi-criteria appraisal. *Land Use Policy*. 2006;**23**:95-107.
- 24 Stirling A. Multi-Criteria Mapping: a detailed analysis manual, version 1.1, produced for the Porgrow Project – SPRU, 2005. Available from <http://www.sussex.ac.uk/spru/1-4-7-1-8-2-1.html> (accessed 10 April 2007).

- 25 Stirling A, Lobstein T, Millstone E. Methodology for obtaining stakeholder assessments of obesity policy options in the PorGrow project. *Obes rev.* 2007;**8**(suppl 2):17-27.
- 26 Millstone E, Lobstein T. The PorGrow project: overall cross-national results, comparisons and implications. *Obes rev.* 2007;**8**(suppl 2):29-36.
- 27 Ross G, Lean M, Anderson A. Dietary interventions in Finland, Norway and Sweden: nutrition policies and strategies. *J Hum Nutr Diet.* 2002;**15**(2):99-110.
- 28 Norum KR. Some aspects of Norwegian nutrition and food policy. In: Shetty P, McPherson K, eds. *Diet, nutrition and chronic disease: lessons from contrasting worlds.* London: Wiley, 1997:195-211.
- 29 Leicester A, Windmeijer F. The "Fat Tax": Economic incentives to reduce obesity. The Institute for fiscal studies. Briefing Note No. 49: London, 2004.
- 30 Mytton O, Gray A, Rayner M, Rutter H. Could targeted food taxes improve health?. *J Epidemiol Community Health.* 2007;**61**:689-94.
- 31 Smed S, Jensen DJ, Denver S. Socio-economic characteristics and the effect of taxation as a health policy instrument. *Food Policy.* 2007;**32**:624-39.
- 32 Woodward SM, Ketley CE, Pealing R, et al. School milk as a vehicle for fluoride in the United Kingdom. An interim report. *Community Dent Health.* 2001;**18**(3):150-6.
- 33 Müller-Riemenschneider F, Reinhold T, Berghöfer A, Willich SN. Health-economic burden of obesity in Europe. *Eur J Epidemiol.* 2008;In press.
- 34 Elinder LS. Obesity, hunger, and agriculture: the damaging role of subsidies. *BMJ.* 2005;**331**(7528):1333-36.
- 35 Lobstein T, Millstone E. Policy options for responding to obesity: evaluating the options. University of Sussex - Brighton. United Kingdom (2006); Available from: URL: http://www.sussex.ac.uk/spru/documents/porgrow_complete.pdf (accessed 5 February 2008).

Figure 1. Ranking of average values of all options.

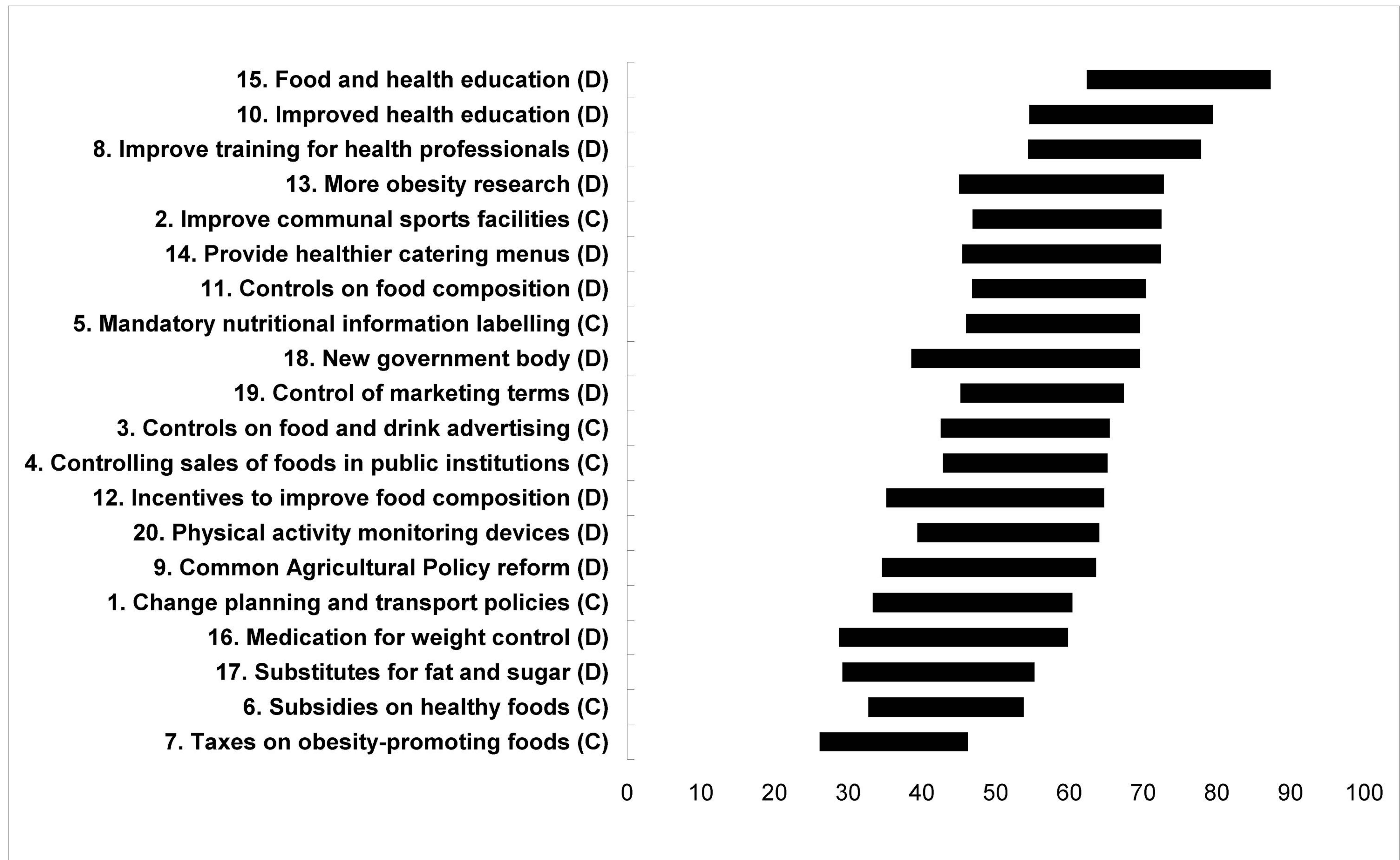


Figure 2. Ranking of average values for taxes and subsidies.

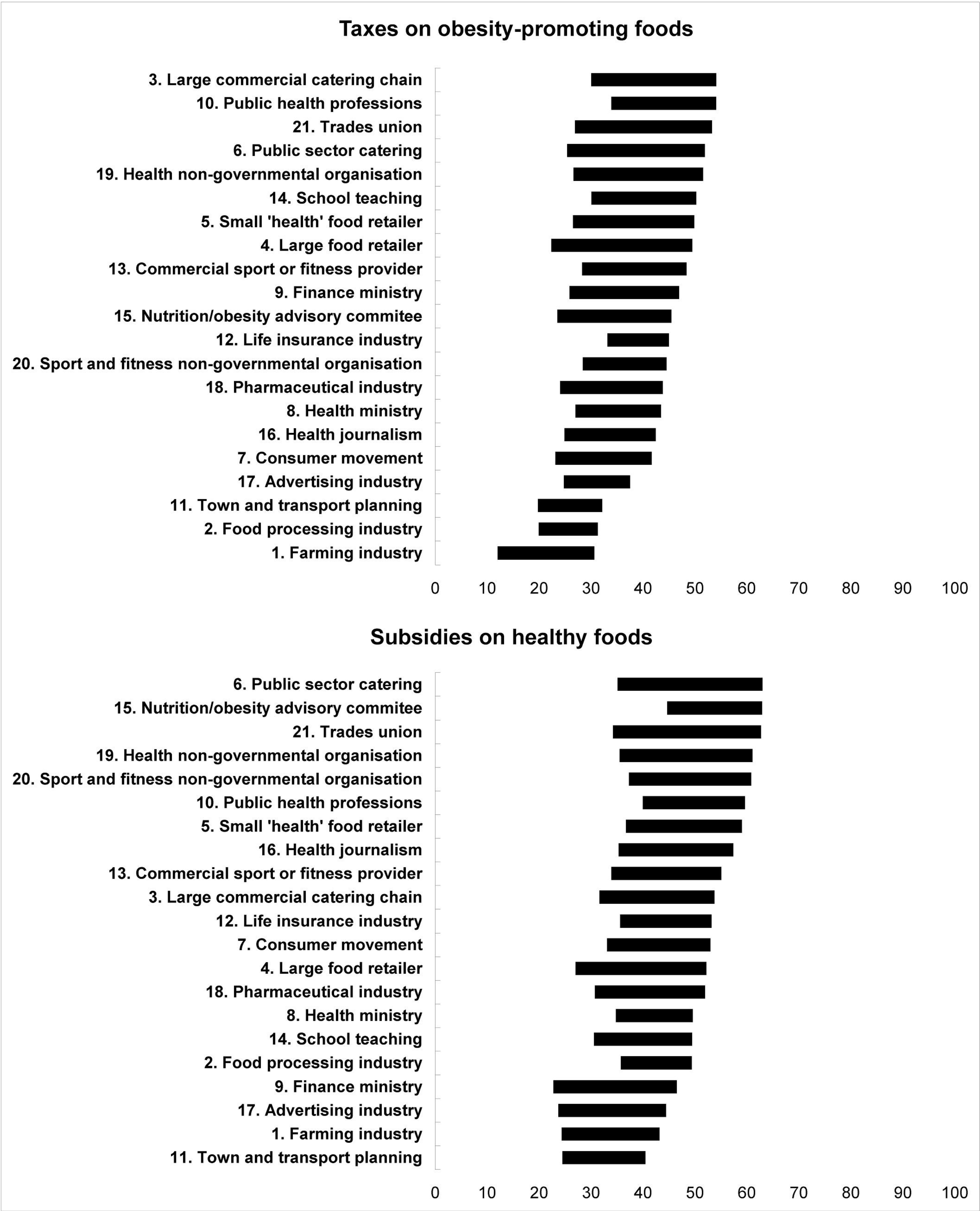


Figure 3. Options with best values for taxes and subsidies.

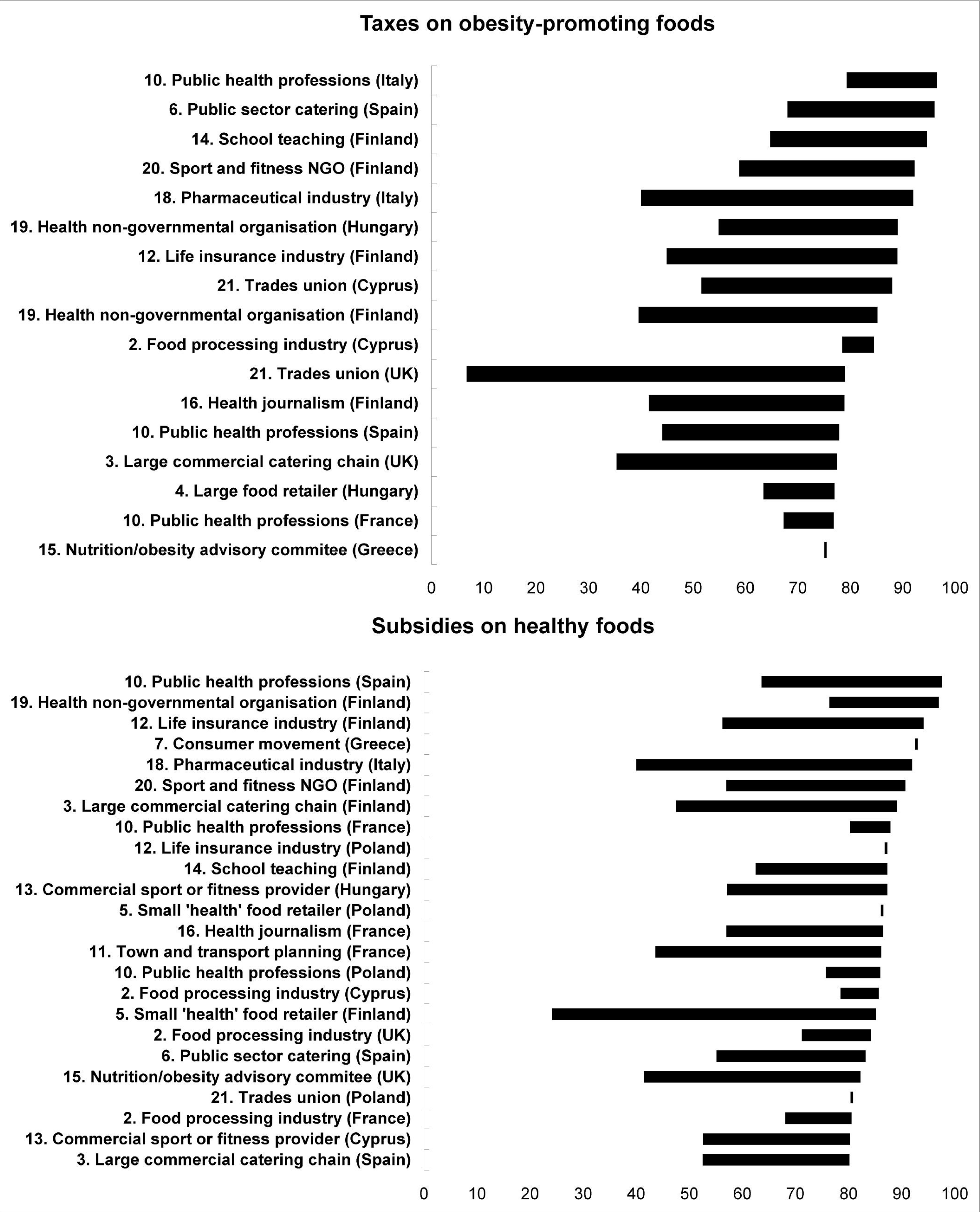


Figure 4. Ranking of average values by country under social and economic criteria for taxes and subsidies categories

